DOCUMENT RESUME

ED 174 940 CS 004 912

AUTHOR Lamb, Rose
TITLE Pre-School Children's Knowledge of Phoneme-Grapheme Correspondences.
PUB DATE Apr 79
NOTE 32p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, California, April 8-12, 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Age Differences; *Beginning Reading; Child Development; Child Language; Language Ability; *Language Development; *Phoneme Grapheme Correspondence; Preschool Education; Primary Education; Reading Readiness; *Reading Research; *Sex Differences; Sight Vocabulary; Spelling; Student Ability

ABSTRACT

The performance of 68 preschool children, ages three (28), four (21), and five (19), on selected phoneme-grapheme correspondence tasks was analyzed for age and sex differences in two stages of data collection. First, the children spelled their first names and the initial of their last names with letters on a magnetic board, after which they arranged all the letters on the board in alphabetical order. Second, the children who accomplished this screening task were shown a set of pictures, then asked to repeat and spell the depicted words with the magnetic letters. No significant age differences on the name tasks were found for three-year-old children; that is, the oldest child in this group did not perform significantly better than did the youngest. Similar results occurred for the five-year-old children, while the four-year-old children showed significant differences between the oldest and youngest on alphabetical sequence. Two significant sex differences were found, favoring three-year-old girls in the name tasks and five-year-old boys on the alphabet tasks. Younger children performed better on the second stage tasks, with younger females performing significantly better than older females. On the basis of this data, it appears that sex and chronological age may be less significant in performing the examined language tasks than had been assumed previously. (Appendixes contain the testing protocol, spelling frequencies, and research procedures.) (RL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED174940

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Pre-School Children's Knowledge of Phoneme-Grapheme Correspondences

Pose Lamb
Department of Education
Purdue University
West Lafayette, Indiana 47907

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Pose Lamb

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CS004912

Pre-School Children's
Knowledge of Phoneme-
Grapheme Correspondences

Pose Lamb
Department of Education
Purdue University
West Lafayette, I[illegible]. 47907

Objectives

The major objective of this study was to assess the knowledge of pre-school children regarding phoneme-grapheme correspondences in selected words, and to analyze their responses in terms of age and sex differences. Subjects were children enrolled in the campus nursery school of a major midwestern university. Words were selected on the basis of evidence provided by Read (1971, 1973, 1975) and C. Chomsky (1974). Children performed tasks designed to assess their abilities to represent, with standard spellings, specified consonant sounds, in initial and final positions, and specified vowel sounds, in medial positions. Because Read's and Chomsky's subjects may have demonstrated some influence of the dialects typical of the Cambridge/Boston area, responses reported here were also analyzed for evidence of midwestern dialect influences.

Sanders (1972) suggests that children in the age groups selected for the purposes of this study demonstrated great variability in their skill in correctly articulating the consonant sounds of special interest to Read (1971, 1973, 1975) and to this researcher. The period of three to six years of age is one of rapid language growth. For example, 88 percent of the three year olds Sanders studied could correctly articulate the /f/ in initial, medial, and final positions, but only 67 percent were successful with the /l/ sound; this is acquired later. However, Sanders' findings suggest that chronological age is not the single most important index of language development. This is an important consideration, as we'll see later.

Read and Chomsky were concerned, first, with children's abilities, at early ages, to reproduce, in writing, the sounds they could utter and, also,

with the evidence provided by their writing regarding the manner in which children organize and categorize their knowledge of the phonological system of American English. Read (1973) found that children use such phonetic properties as nasality, syllabicity, backness, height, and affrication and that children order these characteristics in terms of the spellings selected. Backness was preserved in place of tenseness, and height in vowels and place of articulation were more significant than nasality and voicing in consonants when the pre-school children studied selected letters to represent sounds.

Carol Chomsky's studies of the invented spellings of young children revealed similar tendencies for children to organize, order and apply the knowledge they possess regarding the systematic nature of the phonological facet of American English. It is her contention that children's writing provides excellent insight into a child's language processing and is an effective procedure for introducing the reading process. This is another issue, and beyond the preview of the study I'm reporting.

Read's work, and Chomsky's, involved the analyses of children's stories, letters, etc., which had been written on a voluntary basis. Read's original data were collected informally, and over an extended period of time. While some of Read's and all of Chomsky's data were reported descriptively, and were not subjected to statistical analyses, empirical data to support their descriptive data would be of great significance to linguiscs, teachers of young children and developmental psychologists with particular scholarly interest in language acquisition and the relationship of language acquisition to reading.

Study Procedures

All pupils (N = 68) enrolled in the three, four, and five year old classes of the campus nursery school were involved in this study.

Parents are members of the staff and faculty of the university, graduate students, and professionals in the community. There is no claim that these children constitute a representative sample. Children for whom English is a second language were not involved, beyond the screening process. All aspects of the screening and testing were personally conducted by the researcher or my assistant. The screening process included ascertaining the fact that the ability to discriminate among and correctly articulate the sounds investigated was present in all subjects.

The screening and testing took place in the nursery school classroom or adjoining small rooms. Tasks were performed on a one-to-one basis, with the examiner sitting next to the child at a small table. Because the writing task appears to add a complicating dimension to the problem(s) explored, it was decided to use plastic letters randomly displayed in front of the child. A magnetic board was provided for arranging the letters selected.

For screening purposes, each child was asked to find, and arrange in proper sequence, the letters of his first name and the first letter of the last name. The five year olds who were successful in performing these tasks were asked to complete the spellings of their last names. The final screening tasks involved arranging the letters in alphabetical order. Actual testing involved only those children who were successful in completing the majority of the screening tasks. Results of the screening procedure will be discussed later.

On the basis of Read's findings (1973) the following sounds (and words) were selected as being of special interest:

Sounds Tested	Words Pronounced	
	List A	List B
/n/ in medial position	jet, vent	wet, tent
/c/, /t/ /r/	chin, truck	chick, track
/i/, /e/ /ae/	skin, men, man	pin, pen, pan
/e/ when followed by /l/; influence of final /t/	bell, belt	fell, felt
/r/ in initial, medial, final position	rug, bird, jar	read, girl, car

Admittedly, this is a very brief list; however, a major consideration in a study of this type is testing time. The list is long enough to permit some data gathering but not so long that children tire or become bored. The same directions and stimuli were used with each child, for purposes of standardization. Subjects who were reasonably successful in spelling the words on List A were asked to spell those on List B in another testing session.

There are obvious strengths and weaknesses, in terms of gathering comparable data vs. variability in motivation which result from asking all subjects to spell the same words. After careful consideration, the value of gathering comparable data was viewed as being of a higher order than that of letting children spell those words which interested them most.

To briefly review, subjects were shown a set of pictures, one at a time, always in the order indicated on the preceding list, and were asked to repeat, for purposes of taping, the words depicted. Responses were recorded by the examiner, both in writing and on tape. Subjects who requested permission to hear their tapes were allowed to do so.

Results and/or Conclusions

Screening:

1. Twenty-eight three year olds performed the screening tasks, two boys and two girls could correctly spell their first names. One boy and three girls could correctly identify the first letter of their last names. Eight boys and five girls knew at least four letters of the alphabet; four boys and two girls knew all the letters. Analysis (Chi-Square Goodness of Fit Test) revealed no significant age differences on the first and last name tasks; that is, the oldest child in the group did not perform at a significantly higher level than the youngest. Significant sex differences were found favoring the girls in performance of the name tasks (first name $x^2 = 9.80$, df -2, $p < .01$; last name $x^2 = 15.93$, df = 2, $p < .005$).

2. Twenty-one four year olds performed the screening tasks; nine boys and nine girls correctly spelled their first names and knew the correct first initial for their last names. Ten boys and ten girls knew all the letters of the alphabet. Chi-Square Test for the four year olds revealed significant differences between the oldest and youngest in the group on knowledge of alphabetical sequence ($x^2 = 1.74$, df = 2, $p < .05$).

3. Nineteen five year olds performed the screening tasks; all boys (14) and all girls (5) knew how to correctly spell their first names; ten boys and three girls could correctly spell their last names and thirteen boys and five girls knew most or all of the letters of the alphabet. Analysis revealed only one significant difference; the boys' performance on the alphabet task was superior to the girls' ($x^2 = 4.286$, df = 1, $p < .05$).

Testing Results

As previously noted, only those children whose performance was judged as adequate or better on the screening tasks were tested. Analysis of Variance (ANOVA) for equal cells was used. Sex and age were the independent variables and the dependent variables were categorized in terms of correct initial and final consonants and the representation of a vowel sound. Credit was given for both ck and k as the final letters in truck and track. Children's scores represented a total of the correct letter representations of the sounds tested. Subjects were regrouped into four age groups to eliminate the chronological overlapping which may have affected the screening data reported on the preceding pages.

The analyses revealed a significant effect due to age ($F = 3.39$, $df = 3/36$, $p < .05$). The Newman Kuels test among the means revealed a significant difference between the youngest (22.52) and oldest (11.85) groups. A second analysis of variance was conducted for all children above ages 3-2, including those who performed poorly on the alphabet task. Again, a significant effect due to age was revealed ($F = 13.11$, $df = 1/50$, $p < .005$). For this analysis, subjects were divided into two groups (3-2 to 5-1, 5-2 to 6-1, M, F). Again, the younger children performed better than the older children. A significant sex by age interaction was found ($F = 6.91$, $df = 1/50$, $p < .025$). The Newman Kuels test showed that there was no significant difference between young and older males. However, younger females ($\bar{x} = 21.64$) performed significantly better ($p < .01$) than the older females ($\bar{x} = 6.9$).

Descriptive Data:

1. It is of interest to note that the majority of the children at all levels clearly distinguished the initial sounds of truck and chin, and did not reverse the spellings. This is in direct contrast with Read's findings. Further, the /j/ was chosen by nine children as the spelling for the /c/ (chin = jn).
2. More children than expected were conscious of the final /t/ in 'vent' and 'felt'. Only three children failed to represent it in spelling.
3. The influence of midwestern dialects did appear to surface; vowels were frequently either unrepresented (pn = pin, pan, pen) for all words, or the same vowel letter was used.
4. Children are aware of the 'l' sound and in most cases correctly represented it. This is true even when the vowel preceeding the 'l' is omitted (felt = flt in 10 cases). In fact, consonant sounds and related spellings were correctly identified far more frequently the vowels. No one spelled 'girl' correctly, but 9 children selected GRL as the spelling and only one made an attempt at representing the 'i'.

Educational or Scientific Importance of the Study

1. The design of the research reported here demonstrates that data regarding the knowledge of phoneme-grapheme correspondences of three, four, and five year olds can be gathered systematically and subjected to empirical analysis.
2. It has been assumed that there was a developmental sequence in children's ability to represent the sounds they could produce.

On the basis of the data reported here it appears that chronological age and sex may be less significant than had previously been assumed with respect to the specific facets of language development reported here.

References

Brown, Roger. A First Language: The Early Stages. Cambridge, Mass.: The Harvard University Press, 1973.

Cazden, Courtney B. Child Language and Education. New York: Holt, Rinehart and Winston, 1972.

Chomsky, Carol. "Invented Spelling in First Grade." Unpublished paper presented at Reading Research Symposium, State University of New York at Buffalo, June, 1974.

Chomsky, Noam and Morris Halle. The Sound Pattern of English. New York: Harper and Row, 1968.

Read, Charles. Children's Categorization of Speech Sounds in English. Urbana, Ill.: National Council of Teachers of English, 1975.

Read, Charles. "Children's Judgements of Phonetic Similarities in Relation to English Spelling." Language Learning, 23: 17-39, June, 1973.

Read, Charles. "Pre-School Children's Knowledge of English Phonology." Harvard Educational Review, 41: 1-34, February, 1971.

Sanders, Erik K. "Where Are Speech Sounds Learned?" Journal of Speech and Hearing Disorders, 37: 55-63, February, 1972.

Winer, B. J. Statistical Principles in Experimental Design, Second edition, New York: McGraw Hill Book Company, 1971.

Appendix A

Testing Protocol

Set A

I'm going to tell you the name of the object on all these cards. When I'm finished I want you to tell me the name of the object on each card and spell it with the plastic letters.

I. /n/ in medial position

1. jet

This is a picture of a jet.

2. vent

The baby is sitting next to the air vent. The important word here is vent.

II. /i/ /e/ /ae/

3. skin

The baby's face is covered with skin. The important word here is skin.

4. men

This is a picture of some men.

5. man

This is a picture of a man.

III. /tr/ /ch/

6. truck

This is a picture of a truck.

7. chin

This part of the baby's face is called his chin. The important word here is chin.

IV. /e/ when followed by l.

8. belt

This is a picture of a belt.

9. bell

This is a picture of a <u>bell</u>.

V. /r/ in initial, medial, and final positions

10. rug

This is a picture of a <u>rug</u>.

11. bird

This is a picture of a <u>bird</u>.

12. jar

This is a picture of a <u>jar</u>.

Now we'll go through the cards again and you tell me the name of the object. We'll record what you say. Then we'll spell it with the plastic letters.

Set B

I'm going to tell you the name of the object on all these cards. When I'm finished I want you to tell me the name of the object on each card and spell it with the plastic letters.

I. /n/ in medial position

1. wet

This is a picture of something that is wet. The important word here is wet.

2. tent

This is a picture of a tent.

II. /i/ /e/ /ae/

3. pin

This is a picture of a pin.

4. pen

This is a picture of a pen.

5. pan

This is a picture of a pan.

III. /tr/ /ch/

6. track

The train is running on the track. The important word here is track.

7. chick

This is a picture of a chick.

IV. /e/ when followed by l.

8. felt

This is a piece of material called felt. The important word here is felt.

9. fell

These people fell in the snow. The important word here is fell.

V. /r/ in initial, medial, and final positions

10. read

This is a picture of a book. We read books. The important word here is read.

11. girl

This is a picture of a girl.

12. car

This is a picture of a car.

Now we'll go through the cards again and you tell me the name of the object on the tape recorder. Then we'll spell it with the plastic letters.

Spelling Frequencies

A. III. 6. Truck - 3 & 4 year olds

Trek	1	Tik	1
Tc	1	Trk	4
Trc	2	Twk	1
Sh	1	Traak	1
Truk	2	Hck	1
Zk	1	Tk	3
Te	1		

Truck - 5 year olds

Sr	1	Tan	1
Srx	1	Tuh	1
Hwk	1	Gbk	1
Jk	1	Trc	1
Tku	1	Tuc	1
Tuk	1	Trk	1
Tuun	1		

B. III. 6. Track - 3 & 4 year olds

Trak	4
Trk	1
Jac	1
Thak	1

Track - 5 year olds

Hwk	1	Trk	1
Hk	1	Tak	1
Tak	1		
Tuc	1		
Trac	1		

A. III. 7. Chin - 3 & 4 year olds

Chin	1	Gen	1
Cn	2	Cheen	1
Jn	5	Thin	1
Cen	1	Tn	2
Sn	1		
Gn	3		

Chin - 5 year olds

Heh	1	Han	1
Jn	2	Jan	1
Jjse	1		
Hin	1		
Cium	1		
Chem	1		

B. III. 7. Chick - 3 & 4 year olds

Chik	2
Cec	1
Chak	1
Thek	1
Chk	1

Chick - 5 year olds

Hwk	1	Jk	1
Hk	1		
Hik	1		
Chac	1		
Shac	1		

A. IV. 8. Belt - 3 & 4 year olds

Belt	2
Blt	9
Bes	1
Bt	6
Blat	1

Belt - 5 year olds

Baot	1	Bat	2
Bt	1	Bd	1
Blt	1	Belt	1
Balt	2		
Baalt	1		

B. IV. 8. Felt - 3 & 4 year olds

Felt	2
Flt	3
Fllt	1

Felt - 5 year olds

Flt	1	Fll	1
Ft	1	Fta	1
Fat	2	Falt	1

Appendix B

Spelling Frequencies

A. I. 1. Jet - 3 & 4 year olds

Jet	6
Jit	2
Jas	1
Git	2
Gat	2
Get	1
Jt	4
Gt	4
Geet	1

Jet - 5 year olds

Jeat	1
Jnt	1
Jite	1
Juat	1
Jat	3
Jas	1
Jaet	1

B. I. 1. Wet - 3 & 4 year olds

Wet	4
Wat	2

Wet - 5 year olds

Wt	1
Wat	2
Wet	1
Wht	1
Yat	1

A. I. 2 Vent - 3 & 4 year olds

Vent	3
Vnt	4
Vft	1
V	1
Vt	4
Vet	2
Vat	2
Went	1
Fnt	1
Dnt	1
Et	1
Wt	1

Vent - 5 year olds

V	1
Vnt	1
Wt	1
Vit	1
Vuat	1
Vat	2
Vto	1
Vent	1
Fat	1

B. I. 2 Tent - 3 & 4 year olds

Tent	3
Tant	2
Tet	1

Tent - 5 year olds

Tnt	3
Tint	1
Tat	2
Tait	1

Spelling Frequencies

A. II. 3. Skin - 3 & 4 year olds

Skin	2
Kn	1
Scn	1
Sen	2
Skn	5
Ce	1
Skan	1
Sn	5
Sken	1
Cn	1

Skin - 5 year olds

Sn	1
Sab	1
Sne	1
Skn	3
Sin	1
Scan	1
Sam	1
Son	1
Sa	1
Scn	1
San	1

B. II. 3. Pin - 3 & 4 year olds

Pin	2
Pn	2
Pen	2

Pin - 5 year olds

Pin	1
Pn	4
Pan	1
Pal	1

A. II. 4. Men - 3 & 4 year olds

Men	5
Mn	13
Mun	1
Man	1

Men - 5 year olds

Mon	1	Muuan	1
Mn	2	Mam	1
Mnlm	1	Msm	1
Min	1	Mean	1
Man	1	Men	1

B. II. 4. Pen - 3 & 4 year olds

Pen	3
Pn	3

Pen - 5 year olds

Pn	3	Pen	1
Pine	1	Pnl	1
Pbn	1		

A. II. 5. Man - 3 & 4 year olds

Man	13
Mn	4
Meb	1
Men	2
N	1

Man - 5 year olds

Mon	1	Msm	1
Mn	2	Nm	1
Mim	1	Man	3
Muan	1		
Mam	1		

B. II. 5. Pan - 3 & 4 year olds

Pan	6

Pan - 5 year olds

Pns	1	Pua	1
Pm	1	Pal	1
Pan	3	Pal	1

Spelling Frequencies

A. IV. 9. Bell - 3 & 4 year olds

Bel	2		
Bl	14		
L	1		
Pl	1		
Bal	1		

Bell - 5 year olds

3wo	1	Bac	1
Bl	2	Bel	2
Bb	1		
Bal	2		
Kfl	2		

B. IV. 9. Fell - 3 & 4 year olds

Fel	2
Fl	3
Fal	1

Fell - 5 year olds

Tl	1		
Fl	2		
Fal	3		
Ful	1		

A. V. 10. Rug - 3 & 4 year olds

Reg	3	Rig	1
Rg	7	Rug	1
Rag	1	Rk	1
Sc	1	Wt	1
Wg	2		
Re	1		

Rug - 5 year olds

Wor	1	Rxug	1
Rk	1	Mobg	1
R	1	Raml	1
Rug	2	Req	1
Rag	1	Ruug	1
Lab	1	Reg	1

B. V. 10. Read - 3 & 4 year olds

Red	6

Read - 5 year olds

Wed	1	R	1
Ht	1	Rd	2
Red	1	Yd	1

A. V. 11. Bird - 3 & 4 year olds

Brd	8	Brb	1
Brt	1	Bred	1
Bard	1	Bc	2
Berd	1	Prd	1
Ber	1	Wrb	1

Bird - 5 year olds

Br	2	Bed	1
B	1		
Brd	3		
Brud	1		
Wuge	1		

B. V. 11. Girl - 3 & 4 year olds

Grl	5
Gial	1

Girl - 5 year olds

Grl	4	Gr	1
Kl	1	Gl	1

Spelling Frequencies

A. V. 12. Jar - 3 & 4 year olds

Jer	1
Jr	7
Gr	9
Ger	2

Jar - 5 year olds

H	1	Jar	2
Hj	1	Janr	1
Jc	1	Ars	1
Jr	4	Jor	1

B. V. 12. Car - 3 & 4 year olds

Cr	2
Kr	3
Kar	1

Car - 5 year olds

Ker	1	Cr	3
Kr	1	Cor	1
Kor	1		

Research Procedures:

Innovative Spelling Study

I. Population: 3, 4, 5 year old pupils in the Child Development and Family Life Laboratories at Purdue University

II. Objectives

A. To assess the abilities of pupils in the populations specified above to make graphemic representations of the following phonemes.

I. /n/ in medial position

Contrasts:

A.	1.	jet	2.	vent	
B.	1.	wet	2.	tent	

II. /i/, /e/, /ae/

Contrasts:

A.	3.	skin	4.	men	5.	man
B.	3.	pin	4.	pen	5.	pan

III. /tr/, /ch/

Contrasts

A.	6.	truck	7.	chin
B.	6.	track	8.	chick

IV. /e/ when followed by i

Contrasts:

A.	8.	belt	9.	bell
B.	8.	felt	9.	fell

V. /r/ in initial, medial, and final positions

Contrasts:

A.	10.	rug	11.	bird	12.	jar
B.	10.	read	11.	girl	12.	car

B. To compare findings with those of Charles Read (1) and Carol Chomsky (2).

C. To provide evidence for making judgements about the influence of dialect on spelling choices in the form of tape recordings and written records of the tested population.

III. Procedures:

A. Plastic upper case letters were arranged according to color (e.g. all yellow letters in one group, all blue in one group etc.) All subjects were 'screened' for knowledge of letters in first name, beginning letter of last name, and for all other letters of the alphabet. The subjects chose and placed the appropriate letters on a magnetic board.

B. Examiner showed a picture exemplifying each of the words, in order specified, Set A,I-V and Set B,I-V, and said the word. Examiner then asked the subject to say the word. Responses were recorded on a cassette for later verification of phonological factors bearing on letter choices. After once going through the entire set of words, the examiner tried to be as non-directive as possible and repeated the word for the subject only as a last resort. Attention of subject was directed to letters, and he/she was asked to find the letters that spell the word under consideration and place them on the magnetic board. The exact letter choices were recorded.